



01 2006 **IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Serial No.: 10/565,063

Filed: January 17, 2006

For: Droplet Deposition Apparatus

Group Art Unit: To be assigned

Examiner: To be assigned

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) August 30, 2006

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Reg. No. 28,491

Commissioner for Patents  
P.O. Box 1450  
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Sir:

Submitted herewith is an English translation of the international preliminary report on patentability.

Respectfully submitted,

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August 30, 2006

## PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

**PCT**

NOTIFICATION CONCERNING  
TRANSMITTAL OF COPY OF INTERNATIONAL  
PRELIMINARY REPORT ON PATENTABILITY  
(CHAPTER I OF THE PATENT COOPERATION  
TREATY)

(PCT Rule 44bis.1(c))

To:

GARRATT, Peter, Douglas  
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Date of mailing (*day/month/year*)  
26 January 2006 (26.01.2006)

Applicant's or agent's file reference  
PDG/25918WO

**IMPORTANT NOTICE**

International application No.  
PCT/GB2004/003116

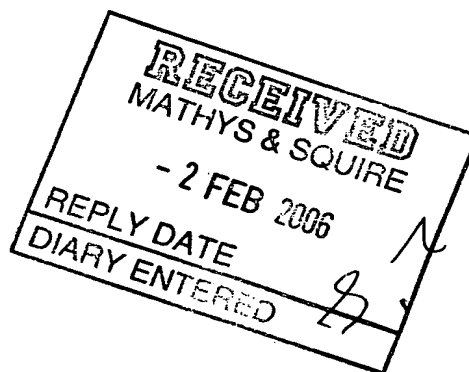
International filing date (*day/month/year*)  
16 July 2004 (16.07.2004)

Priority date (*day/month/year*)  
16 July 2003 (16.07.2003)

Applicant

XAAR TECHNOLOGY LIMITED et al

The International Bureau transmits herewith a copy of the international preliminary report on patentability (Chapter I of the Patent Cooperation Treaty)



The International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland

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Dorothee Mülhausen

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# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference PDG/25918WO	<b>FOR FURTHER ACTION</b>	See item 4 below
International application No. PCT/GB2004/003116	International filing date ( <i>day/month/year</i> ) 16 July 2004 (16.07.2004)	Priority date ( <i>day/month/year</i> ) 16 July 2003 (16.07.2003)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant XAAR TECHNOLOGY LIMITED		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).
2. This REPORT consists of a total of 9 sheets, including this cover sheet.  
  
In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.
3. This report contains indications relating to the following items:
 

<input checked="" type="checkbox"/> Box No. I	Basis of the report
<input type="checkbox"/> Box No. II	Priority
<input type="checkbox"/> Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input checked="" type="checkbox"/> Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/> Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/> Box No. VI	Certain documents cited
<input type="checkbox"/> Box No. VII	Certain defects in the international application
<input type="checkbox"/> Box No. VIII	Certain observations on the international application
4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Date of issuance of this report 16 January 2006 (16.01.2006)
Facsimile No. +41 22 740 14 35	Authorized officer  <div style="text-align: center; font-weight: bold;">Dorothee Mülhausen</div> Telephone No. +41 22 338 87 40

# PATENT COOPERATION TREATY

REC'D 11 FEB 2005

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From the  
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

## WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/GB2004/003116

International filing date (day/month/year)  
16.07.2004

Priority date (day/month/year)  
16.07.2003

International Patent Classification (IPC) or both national classification and IPC  
B41J2/175, B41J2/14

Applicant  
XAAR TECHNOLOGY LIMITED

### 1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

### 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

### 3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/GB2004/003116

**Box No. I Basis of the opinion**

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:
    - ☐ a sequence listing
    - ☐ table(s) related to the sequence listing
  - b. format of material:
    - ☐ in written format
    - ☐ in computer readable form
  - c. time of filing/furnishing:
    - ☐ contained in the international application as filed.
    - ☐ filed together with the international application in computer readable form.
    - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/GB2004/003116

**Box No. IV Lack of unity of invention**

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:

☒ paid additional fees.

☐ paid additional fees under protest.

☐ not paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is

☐ complied with

☒ not complied with for the following reasons:

**see separate sheet**

4. Consequently, this report has been established in respect of the following parts of the international application:

☒ all parts.

☐ the parts relating to claims Nos.

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	4-7,10-13,15-20,22-24,26-29
	No: Claims	1-3,8,9,14,21,25
Inventive step (IS)	Yes: Claims	4-7,15-20,22-24,26-29
	No: Claims	1-3,8-13,14,21,25
Industrial applicability (IA)	Yes: Claims	1-29
	No: Claims	

2. Citations and explanations

**see separate sheet**

**Re Item IV.**

1. The separate groups of inventions are:

Claims 1-13:

Droplet deposition apparatus with a porous element between the ink chamber and the inlet or outlet manifolds.

Claims 14-29:

Droplet deposition apparatus with a net flow in the array direction in the inlet manifold and no net flow in the array direction in the plenum chamber.

They are not so linked as to form a single general inventive concept (Rule 13.1 PCT) for the following reasons:

- 2.1 US-A-6152559 discloses a ink jet printing device comprising an inlet manifold (22), an outlet manifold (27) and a fluid chamber (40) in communication with a plurality of droplet deposition orifices (42), the fluid chamber being separated from the inlet manifold by a porous element (23) and there being in use of the device a flow of fluid between the inlet manifold and the outlet manifold through the fluid chamber and the pressure drop across the porous element is the dominant pressure drop in the flow.
- 2.2 The subject matter of claim 2 differs from US-A-6152559 in that the outlet manifold is separated from the fluid chamber by a porous element. These differing features can therefore be considered to be the special technical features of the first invention.  
Thus, on the basis of the newly determined special technical features, a new objective problem needs to be formulated. This could be said to be avoiding contamination of the outlet manifold by debris coming from the fluid chamber.
- 2.3 US-A-6152559 does not disclose that there is a net flow in the array direction in the inlet manifold and no net flow in the array direction in the plenum chamber. Therefore these features of independent claim 14 are considered to be the special technical features of the second invention.

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING  
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/GB2004/003116

- 2.4 These features are obviously not the same. Furthermore they are not corresponding since they solve different objective problems namely:

Invention 1: avoiding contamination of the outlet manifold by debris coming from the fluid chamber.

Invention 2: uniformising ejection conditions of the droplet deposition orifices.

- 2.5 Since these features are not the same and do not correspond, there are no special technical features which could support a common inventive concept and the technical relationship required by Rule 13.2 PCT is not present.

**Re Item V.**

1. The following documents are referred to in this communication:

D1: US-A-6 152 559 (KOJIMA MASATOMO) 28 November 2000 (2000-11-28)  
D2: US 2002/180827 A1 (HIROTA ATSUSHI) 5 December 2002 (2002-12-05)  
D3: US-A-5 561 448 (HIROSAWA TOSHIKI ET AL) 1 October 1996 (1996-10-01)  
D4: WO 03/022586 A (MANNING HOWARD JOHN ; PHILIPS CHRISTOPHER DAVID (GB); XAAR TECHNOLOGY) 20 March 2003 (2003-03-20)  
D5: EP-A-0 924 077 (LEXMARK INTERNATIONAL, INC) 23 June 1999 (1999-06-23)  
D6: EP-A-0 737 580 (CANON KABUSHIKI KAISHA) 16 October 1996 (1996-10-16)

2. The application does not meet the requirements of Article 6 PCT, because claims



1,2,14,16,25 are not clear. The reasons are the following:

- 2.1 Claim 1 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claim attempts to define the subject-matter in terms of the result to be achieved, namely "the pressure drop across the porous element is the dominant pressure drop in said flow", which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.
- 2.2 Claim 2, dependent on claim 1, claims in one alternative a second porous element separating the fluid chamber and the outlet manifold. Claim 1 claims that "the pressure drop across the porous element is the dominant pressure drop in the flow. In claim 2, in the above-mentioned alternative it is therefore not clear which porous element (the first between the inlet manifold and the fluid chamber or the second between the fluid chamber and the outlet manifold) produce the dominant pressure drop.
- 2.3 Claim 14 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The **apparatus claim** attempts to define the subject-matter in terms of the result to be achieved, namely "there being, in use, a flow of fluid from the inlet manifold through the plenum chamber to the ejection chambers, there being a substantial net flow in the array direction in the inlet manifold, and substantially no net flow in the array direction in the plenum chamber", which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result. The above-mentioned features being not clear, they will not be taken into account for assessing novelty and inventive step.
- 2.4 A similar remark (§2.3) applies for claims 16 and 25
3. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1,14,21,25 is not new in the sense of Article 33(2) PCT.
- 3.1 Document D1 discloses (the references in parenthesis applying to this document):

A droplet deposition apparatus comprising an inlet manifold (22), an outlet

manifold (27) and a fluid chamber (40) in communication with a plurality of droplet deposition orifices (42), the fluid chamber being separated from the inlet manifold by a porous element (23) and there being in use of the apparatus a flow of fluid between the inlet manifold and the outlet manifold through the fluid chamber and the pressure drop across the porous element is the dominant pressure drop in the flow. (claim 1)

Even if document D1 does not explicitly specify that the pressure drop across the porous element is the dominant pressure drop in the flow, it is technically implicit for the skilled person that this is the case in document D1 (fig.1)

3.2 Documents D2 and D3 disclose also all the features of claim 1.

3.3 Document D5 discloses (the references in parenthesis applying to this document):

A droplet deposition apparatus(fig. 3 and 4) comprising an array of ejection chambers (54a) spaced in an array direction, each communicating with a droplet ejection orifice (56a); at least one plenum chamber (between plates 54 and 60) extending in the array direction (fig.4) and communicating with each of the ejection chambers; and an inlet manifold (152c) extending in the array direction and communicating with the plenum chamber through an element (60) providing a resistance to a fluid. (claim 1 without unclear features)

It is also considered that, due to the architecture of this head, the conditions on the flow in the plenum chamber and inlet manifold claimed in the above-mentioned unclear features (§2.3) are fulfilled.

3.4 Document D5 discloses also all the features of claim 25 considering that the inlet and outlet plenum chambers are formed by one chamber (between plates 54 and 60) and the inlet and outlet manifolds by one manifold (152c)

3.5 Document D6 discloses (the references in parenthesis applying to this document):

A method of supplying a fluid to an orifice of a droplet deposition apparatus having a line of orifices (fig.18) and an ink supply manifold extending parallel to said line of orifices, said method comprising the steps of: supplying ink in said manifold flowing substantially parallel to said line of orifices (due to the architecture of head

of fig.18) and in a volume in excess (see embodiment 5) of that which may be ejected from the orifices, and causing said ink to flow through at least one restrictive element (corner where arrow A is drawn) and into a plenum chamber (26) wherein the flow of fluid within said plenum chamber is substantially orthogonal to said line of orifices (due to the architecture of head of fig.18). (claim 21)

4. Dependent claims 2, 3, 8, 9 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty (Article 33(2) PCT).
5. Dependent claims 10-13 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step (Article 33(3) PCT).
  - 5.1 The features of claims 10 to 12 are merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to solve the problem posed.
  - 5.2 The subject matter of claim 13 differs from D1 by the following feature: a Wheatstone bridge arrangement is provided for controlling pressure at orifice. The same feature has already been used for the same purpose in document D4. It would therefore be obvious to the person skilled in the art, to apply this feature with corresponding effect to a droplet deposition apparatus according to document D1, thus arriving at an apparatus according to claim 13.